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TECHNICAL FEASIBILITY OF ATOMIC ENERGY CONTROLS

The establishment of international control of atomic energy has from the outset been the principal aim of all the Atomic Scientists organizations. The achievement of this aim hinges on two premises: the controls must be technically feasible, and they must be politically acceptable to the principal nations of the world.

Slowly and cautiously — in our opinion too slowly and cautiously — the Allied governments are exploring the political aspects of the problem. Because of their technical knowledge it is especially important that scientists should actively participate in the study of the other aspect — that of technical feasibility.

The scientific groups in the Federation of Atomic Scientists have devoted considerable thought to this problem. Naturally each group has examined in some detail the application of inspection systems to its own processes. However none of the groups has had access to all the relevant information nor to enough advice in some fields. Much valuable time has thus been lost. The longer we delay, the more advanced the atomic power development will become in various countries, and the more difficult it will be to put the controls into operation.

Various types of controls have been suggested, extending to raw materials, industrial installations and key scientific and industrial personnel. What is desired, is a combination of simplicity and efficiency of controls. We want a system involving the minimum of prying into industrial and personal privacy, which will still provide safety against evasions. Any single method should be evaluated from these two points of view; and the best one selected; very likely, only a combination of several inspection methods will provide, by their cumulative effect, a fair degree of security. We will attempt to discuss them in separate articles in this and the following issues.

An ideal control system would be one which operates successfully even when all countries are permitted to build large power plants and other installations containing more fissionable material that is required to produce one or more bombs. The controls would probably be much simpler, and the security afforded the people of all nations much greater, were industrial developments limited, at least temporarily, to the production of radioactive elements. Many scientists believe that this will not be too great a price to pay for security against atomic warfare. The question of technical feeasibility of control may thus involve a decision to postpone the benefits accruing from large scale industrial use of atomic energy. To arrive at a reasonable decision, an evaluation of the actual gains to our economy to be expected from atomic power plants will be required. This problem, too, we intend to treat in future issues.

It seems high time for some appropriate agency — perhaps the Federation of Atomic Scientists or the University of Chicago Office of Enquiry, to call together a conference of experts in such fields as geology, mining engineering, power production, industrial inspection, international control of drugs, intelligence service, and other persons with relevant experience, to discuss with atomic scientists and atomic engineers the technical facts on which a system of controls and inspection could be based. The Manhattan District is in possession of many data which would be of great importance in such a discussion; attempts should be made to enable all its experts to take part in such conferences. Since controls by inspection are the avowed aim of United States policy on atomic power as formulated in the Truman-Attlee-King statement, all branches of the government should be willing to participate in devising the best methods for implementing this policy.

The question is not that of providing atomic scientists with information to which they are not entitled under war-time "compartmentation" rules, so as to make them all-round experts on atomic power. What is imperative is that the people of this country be given the factual basis for the intelligent discussion of this most fundamental problem of national policy.

ATOMIC POWER CONTROL PROBLEMS

I. MINING CONTROLS

Atomic power production starts with the mining of uranium ores. It is therefore natural that in the discussion of atomic power controls first thought should be given to uranium mining. A case can be made for mining providing a satisfactory basis for the whole system of international controls. This, however, can only be true if all nations forgoe — for the time being — larbe scale atomic power production. In this case each country needs to be allotted only as much uranium as is required for nuclear research, medical applications and radioactive tracer production.

If atomic power developments are to be permitted, larger amounts of uranium will have to be allocated to individual nations and mining control will cease to be a sufficient safeguard against the manufacture of atomic weapons.

It may however remain a useful first step in a system of controls which will have to extend to all plants and laboratories in which uranium is used or can possibly be used.

The mining control could operate as follows:

(1) All nations will provide the international control commission with maps showing the location of all mining activities, specifically designating those mines capable of producing uranium as main product or by-product.

(2) All mines of the latter type will be put under international supervision. In practice, most, if not all, of them could be closed down since amounts of fissionable material sufficient for research and medical uses can be allocated to all nations by distribution of the reserves accumulated at present in the United States. Later, a few mines can be allowed to resume production under U.N.O. administration, supplying the needs of all nations on an equitable basis.

(3) No nation should be allotted so much uranium that it could start producing atomic bombs on a significant scale. The existing bombs must, of course, be dismantled.

(4) All nations should be kept accountable to the U.N.O. commission for the use of allocated fissionable materials; U.N.O. inspectors should be permitted to check the accounts at any time. This will necessitate the inspection of

(Continued on Last Page)

UNIV. OF MICH.

GENERAL GROVES ON THE FUTURE OF THE ATOMIC BOMB PROJECTS

General L. R. Groves spoke to an assembly of Met Lab scientists on December 18, concerning the future of the Manhattan Project.

He stressed the serious situation into which he believes the Project was placed by what he called "unnecessary delay" in congressional legislation. He does not expect the bill which will emerge from Congressional deliberations to be much different from the original May-Johnson bill. In his opinion, if the Senate Committee has learned anything from the hearings, it is that the whole matter is very complex. Therefore he believes that no detailed specific legislation will be possible; all that can and will be done is to appoint a commission and to give it full authority in the whole field of atomic energy. He does not care whether this Commission will consist of 7, 9 or 11 men, nor for other details. He did not write the May-Johnson bill, and if he had written it, he would have incorporated some of the suggestions made later by scientists.

The Army is anxious for the transfer of authority to the Commission because of the immense outlay it has to carry now in running the Projects. This desire was confirmed to Gen. Groves by Sec'y Patterson and Gen. Eisenhower only a few days earlier.

He believed that even if an atomic energy bill is adopted soon after Christmas, the Commission will be unable to really take over before June or July. Therefore, the Army sees itself obliged to make decisions. In October, General Marshall asked Gen. Groves to go ahead with planning as if no Commission were in sight. In November this instruction was confirmed by Sec'y Patterson.

One of the decisions which the Army will have to make is that on declassification. Recommendations of the Declassification Committee, which met in November at Pasadena, are now being considered by the Army and prompt decision on at least certain wide fields of basic research are to be expected. In other fields, rather delicate jig-saw cutting will be necessary to separate things which can be released from those which will have to be kept secret.

Asked later what he meant by "basic" knowledge, Gen. Groves replied that the word is difficult to define, but that he thinks of basic knowledge as that which is either generally known or can be easily found out. The Army does not intend to keep secret from American students facts which are openly taught in schools abroad.

Another problem to be decided by the Army is the plan for the future of the Project after June 30. In talking with members of the Administration and of Congress, General Groves found that at least for 2-3 years ahead—which is as far as he feels one can make predictions in Washington—there is no danger of the Project not finding full support from the government. In his discussions with the Congressmen, he did not attempt to minimize the costs, but stated that about $500 millions yearly will be required to keep the Project going, and found no opposition.

The present plans are to keep Los Alamos, Clinton, and Argonne , and other Chicago laboratories running. Scientists at Los Alamos should be given the permission to devote 1/4 of their time to free basic research, whether connected with the atomic weapon work or not. This should be a "part of their salary." Project work at universities—primarily Chicago and California, but also in some smaller colleges—is also to be continued after June 30; it should be restricted, as far as possible, to non-classified subjects.

Argonne Laboratory shall be run in such a way as to give greatest possible scope to non-classified work, thus enabling students from various universities and colleges in the Middle West to work there. The future division of work between Clinton and Argonne is now bein carefully considered by Colonel Nichols. The relation of Argonne to the Institute of Nuclear Studies remains to be clarified—much will depend on the policy adopted by the Institute.

Oak Ridge and Hanford works are to be kept in production.

General Groves apologized for deficiencies in the work of the administration of the Manhattan District caused by demobilization. He said the District is in the same trouble as all the Army establishments, and has to substitute regular Army officers without experience for experienced personnel which is being discharged in accordance with the point system.

A similar trouble exists with scientific personnel, which is leaving to take up peace-time jobs. General Groves said that although he can make no formal promises, he believes that the scientific jobs in the Project Laboratories offer as good a stability and permanence as any other such job in the country. He has assurances in this respect from the President, the Secretaries of War, Navy and State, General Eisenhower, as well as from all eleven members of the Senate committee on atomic energy.

In terminating his speech, General Groves promised sympathetic treatment of scientists in uniform (SED men).

In the discussion period, which had to be cut short by General Groves' departure, Dr. Franck suggested that the delineation between secret and non-secret information should be left to scientists working directly in the field, and not to the Army or its top scientific advisors. This view was supported by Dr. Dempster who recalled that scientists themselves had kept secret the important development in 1940. Gen. Groves' answer was, that in 1940 only few scientists knew about the facts, and there was no general interest in them from outside.

Dr. Franck referred to the stifling effect of compartmentalization on research progress. General Groves replied that the only two directives given to Project Directors were (1) "everybody should be given all information he needs for his work" and (2) "nobody should be given information which he does not need for his work." Dr. Franck pressed the point, saying that the success of scientific research depends on free exchange of ideas between people who do not work on exactly the same problem.

Dr. Franck also asked General Groves whether scientists interested in the problems of world-wide atomic energy controls could be given access to the pertinent information available in other branches of the Project. Otherwise, he said, it is difficult for them to arrive at well-founded conclusions concerning the technical feasibility of various suggested control system, and to advise the Congress intelligently. General Groves answered that the material in question is too voluminous, and the Army too busy. It was then suggested to General Groves that consultation with experts could make the study of original material unnecessary. The General answered that the geologists and surveying experts are leaving the Project as rapidly as all the other scientists. Asked whether these experts are permitted to discuss such subjects as mining controls with other scientists, he answered yes, as long as they do not reveal classified information.

General Groves added that he does not see the necessity for any scientists testifying before the Congress to be fully informed about **all** aspects of the atomic power problem. Each of them should answer as expert in **his** field. In his own hearing, he said, he often answered that he is not an authority on a particular question and can only quote what he thinks is the opinion of better informed individuals.

GENERAL MEETING:
Wednesday, December 26, 7:45 p.m. in Rosenwaid, Room 2 — Agenda: National Science Organization; Domestic Legislation.

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CONGRESSIONAL NEWS . . .

SENATE HEARINGS ON ATOMIC ENERGY

In the last issue, short reports were given on the testimony of Sachs, Groves, Langmuir, Urey and Bush. Here we continue the account on the basis of newspaper reports, which unfortunately grow less and less satisfactory as the hearings proceed. The space given to the Foreign Affairs Committee hearings on Hurley's charges against the State Department, not to speak of the Pearl Harbor investigation, is incomparably larger than that devoted to atomic energy hearings; many papers carry no reports of the latter at all.

December 5. J. R. Oppenheimer. The cost of atomic bombs, compared with that of battleships, is so small that they raise a serious problem as to the value of capital ships, Dr. J. R. Oppenheimer told the Committee.

c We declined to testify publicly on what specific effects an atomic bomb would have on a fleet at sea, but added that the bomb would do great damage and that under the sea it was far more effective than overhead.

He emphasized that international control of the atomic bomb must be based on the good faith of nations of good-will.

He said: "Today all nations, all peoples, have an overriding community of interest in the prevention of atomic warfare. There would thus seem to be good reason for attempting to establish in the international control of atomic armament those patterns of confidence, collaboration and good faith which in a wider application must form the basis of peace. There may not be a comparable opportunity again."

Dr. Oppenheimer advocated destruction of the American stockpile of atomic bombs, if necessary, to get world peace.

Dr. Oppenheimer said that an atomic energy plant supplying heat to a city could be converted to atomic bomb manufacture in two or three months; that 1000 bombs could be made in two years, 200 could be made in little more than a year, and fifty in nine months. He also said that there were and there would be, "no specific counter-measures to atomic weapons."

H. A. Bethe. Dr. Bethe saw no likehood that the atoms of elements much more common than uranium could be used in atomic bombs.

Remarking that there had been much "loose talk" about destroying the earth Dr. Bethe said:

"It can be stated with complete assurance that atomic bombs of the present type or of any type that is now in sight will not produce high enough temperatures to cause nuclear chain reactions in either the atmosphere or in water. Theoretical arguments which are probably reliable would even indicate that no temperature, however high, would permit the ignition of the atmosphere."

"Only if one had an enormous amount of water or air, about the size of the sun, and if one then raised this large amount all at the same time to a temperature of many millions of degrees, could there be a self-sustaining nuclear reaction in these substances. It, therefore, seems extremely unlikely that there will be any possibility of igniting the atmosphere or the sea by atomic bombs."

Dec. 6. Philip Morrison told of the findings of a party that inspected the devastated cities after the Japanese surrendered.

"The atomic bomb is a weapon of saturation. It destroys so quickly and so completely such a large area that defense is hopeless. Leadership and organization are gone. Key personnel are killed. With the fire stations wrecked and firemen burned, how control a thousand fires? With the doctors dead and the hospitals smashed, how treat a quarter of a million injured?"

"When the bomb is detonated in the middle of a city, **it is as** though a small piece of the sun has been instantly created. There is formed what we have called the ball of fire, which is a hot, glowing mass something about one-third of a mile across, with a temperature of about 4,000,000 degrees Fahrenheit in the center. There is a sudden expansion which pushes away, with terrible violence, the air that once occupied this region. Behind the wave of pressure, which travels rapidly through the air, there come great winds, 500 to 1,000 miles per hour, winds which damage and destroy all structures."

"Houses and buildings for a mile in all directions are totally destroyed. A good deal of comment has been attracted by the ferro-concrete structures whose walls still stand. These are very strong buildings. But they too are useless. I have been in these buildings. The interior walls are down, the roofs are collapsed, the furniture battered, plumbing fixtures and heavy machinery overturned. Brick buildings, and even steel-frame buildings with brick walls, are extremely vulnerable."

"Of those people within a thousand yards of the blast, about one in every house or two escaped death from blast or from burn. But they died anyway from the effects of rays emitted at the instant of the explosion. This radiation affects the blood-forming tissues in the bone marrow. The blood does not coagulate but oozes in many spots through the unbroken skin, and internally seeps into the cavities of the body. The white corpuscles which fight infection disappear. Infection prospers and the patient dies, usually two or three weeks after the explosure. Like all nuclear physicists, I have studied this disease a little. It is a hazard of our profession. With the atomic bomb, it became epidemic."

Dr. Morrison said it is probable that that an atomic-bombed American city "would be as badly damaged as a Japanese city, though it would look less wrecked from the air."

"In Japan the wreckage burned clean; in a western city, the rubble would stand in piles in the streets," he said. "But the city would be just as ruined and the people of the city as dead."

December 10. L. Szilard. Dr. Szilard considered the resources the United States and Russia and concluded that this country would be at a disadvantage in an atomic arms race. He estimated it would take us ten years at a cost of $20,000,000,000 a year to relocate and decentralize our industries and population, while the U.S.S.R. would need only two or three years.

Dr. Szilard said that twenty tons of plutonium could produce in one year as much power as the whole of the United States was capable of producing in a year before the war. He pointed out that our reserve of fissionable material now used in atomic bombs might be accumulated in a geometrical progression.

"If the output of fissionable substances will increase in a geometrical progression, atomic power will not be an important factor in our power economy for perhaps ten years. Then, rather suddenly—that is, within a few years—it might become a very important factor effecting our economy."

"We might then make use of the building of atomic power installations for stabilizing our economy. In times when a depression threatens, electrification of our railways, based on atomic power plants, may be pushed with the support of the Federal Government, whereas in boom periods an expansion of atomic energy power projects might be discouraged."

Dr. Szilard thought fissionable material might be produced in an "internationalized" area and, under stable world conditions, distributed to various countries for power purposes.

Senator McMahon asked whether violation of the treaty governing the area might not bring on a struggle between nations for control of it. Szilard thought the area might be situated where it could be bombed and destroyed if a war developed.

Dr. Szilard said "compartmentalization" of scientists was the c a u s e for our failure to realize earlier that light uranium (U235) might be produced in quantities, and caused a delay of 18 months in the production of the bomb.

Federation of Atomic Scientists at Senate Hearings

December 12. Representatives of the Federation of Atomic Scientists

J. A. SIMPSON, (Chicago) One of the unexpected by-products resulting from the development of atomic energy is the changed attitude of scientists.

I should like to discuss briefly the evolution of our thinking about the bomb. These ideas are common to almost two thousand men, who have, as individuals, widely varying scientific and political backgrounds.

These ideas did not develop overnight but are the result of a considerable period of evolution. During the early days of the Project, we spent little time thinking about the possible effects of the bomb we were trying to make. Early in 1945 it became obvious that there was every likelihood of reaching our goal. It was then that the scientists became increasingly interested in possible consequences of success.

During the meeting of the United atomic energy would be taken into consideration in setting up the U.N.O. By May and June, larger discussion groups were meeting in the laboratory, always remaining well within the security regulations.

For the first time in history, a new age lay in the hands of a relatively few men unknown to the rest of the world. Could such a group of men thrust upon the world such new developments without assuming the obligation of informing our people concerning the changes they must face if they are to survive?

That obligation is being assumed by the overwhelming majority of scientists. Men who were isolationist in spirit, men of every shade of political thought, were all brought together.

Thus, a few weeks after the bomb was dropped there spontaneously developed loose organizations at Los Alamos, Chicago and Oak Ridge. We saw that the people of this country had completely failed to understand what atomic energy would mean to them in the very near future. We felt very strongly that we would have to start an effective educational program to correct this lack of understanding.

It was obvious, too, that this program of education would have to be on a national level. With such a program in mind, the Associations from the six sites met in Washington. Ever-increasing numbers of scientists, outside the atomic bomb projects, have been organizing around this problem, all over the country; in Cambridge, in Pasadena, in Philadelphia, and elsewhere. They are men of science in all fields of specialization, and they have been getting together in making the educational program more effective and of greater aid to our nation.

Irrespective of other international agreements, we all feel that international or world control of atomic energy is essential to the maintenance of peace.

We realize clearly that the over-all feasibility of international control and inspection of atomic energy installations is a political problem of great difficulty. At the same time we recognize that a portion of that problem involves the technical feasibility of inspection and control throughout the world. It is, however, not only for the scientists associated with the Manhattan District to consider the problems of inspection, but also men competent in discussing airborne missiles and rockets, control of strategic materials and the economics of engineering processes must contribute their knowledge.

The present procedure of compartmentalization and secrecy of information makes it impossible for them to work together effectively on this problem. A major portion of the information needed is secret and cannot be assumed known to this Committee.

It seems to us that there are at least three ways out of this impasse. First, the Manhattan Project, or our government directly, could authorize an expert committee to receive and digest the material from selected scientific contributors. Second, this Senate Committee could hear all the testimony of the individual experts and attempt on their own to integrate the information which they have obtained. Third, this Senate Committee may arrange to appoint and direct a special committee of scientists and engineers to receive, study and integrate this material. Our men and the results of their thinking on the technical portions of the problem are at the disposal of the Committee.

CLARKE WILLIAMS (New York). It seems fairly clear that international control of atomic energy requires an inspection by some international agency.

In order to set up such inspection, two phases of the problem must be solved: one phase is political, the other technological. The two are interrelated, and require simultaneous solution.

Political problems are (1) the setting up of an international control agreement; (2) free access of inspectors to all critical points; and (3) enforcement of regulations.

The other phase is the technological one. I have found that within the limits of his own field, each scientist feels that techniques for inspection can be worked out. However, the compartmentalization is severe, so no one person is in a position to consider the feasibility of inspection covering the whole range of methods for producing fissionable materials.

Should a group of scientists and engineers be selected to make a suitable integration, they should have access to **all** the necessary material and have the opportunity for free discussion with experts in all fields.

To illustrate my point, I would like to indicate the sort of questions that would be raised in considering the feasibility of inspection of a gaseous diffusion plant for separating Uranium-235.

The problem can be divided into two parts: First, to insure that no material is illegally diverted from existing known plants; and second, to discover any attempts to build and operate a secret diffusion plant. One basic check that may be suggested is to keep an inventory on all uranium from the ore, to the final product and wastes. Specialists in geology and mining, in metallurgy, in uranium and fluorine chemistry, and in the gaseous diffusion process itself would all be needed to work out this problem.

The problem of discovery of a secret plant involves a detailed knowledge of all the components that go into such a plant, such as pumps, instruments, special materials, etc. Some of the components may be unique, and easy to identify.

For example, there are several thousand centrifugal pumps in the gaseous diffusion plant. Any one with some familiarity with centrifugal pumps could recognize them in any factory. To build several thousand such pumps secretly would be very difficult.

Another characteristic item is the unique material which has to be made and fabricated on a large scale. Such manufacture would be extremely difficult to conceal.

The amount of power needed to operate a diffusion plant is large. Power experts can determine whether such quantities could be diverted from existing electrical networks be produced directly from fuels available at the site.

Engineers who have been instrumental in laying out the present plant could give details as to how extensive the preparation of a plant site must be.

Other feasible methods of inspection involve scientific and technical personnel necessary to develop, design and operate such plants.

Undoubtedly no system of inspection could be absolutely certain to prevent secret production. However, under a good inspection system, the risk of being caught in a violation would deter any nation from such an attempt. Furthermore, a good inspection system would create among all nations a greater feeling of confidence in the behavior of their neighbors. This in itself will render the secret production of atomic armaments much less likely.

ALVIN M. WEINBERG. (Oak Ridge) In the very long run we can expect nuclear fission to compete on a strictly economic basis with ordinary power sources. But nuclear power is unique in

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Senate Hearings. . .Cont'd

perhaps five essential respects. It is in the explotation of these features of uniqueness rather than in particular economic advantages that we can expect the immediate future of nuclear power to lie.

1. The release of nuclear power is accompanied by the production of enormously intense radiations. The same rays which cause such damage in massive doses, can have therapeutic effects. Piles can be built immediately for large-scale radiation therapy.

2. The release of nuclear power is accompanied by production of radioactive substances in enormous quantity. The uses which we can foresee for these radioactive atoms are medical, scientific and industrial. The waste from the Hanford plant contains enough radioactive material to completely supercede radium as a medical agent.

3. The release of nuclear power requires no oxygen. Here is an ideal fuel for use in a submarine; with it a ship can travel as fast underwater as on the surface.

4. Nuclear energy is extremely concentrated. Regions of the earth such as the arctic, in which the cost of fuel transportation makes large-scale power or heating developments unfeasible could be supplied, economically, with nuclear power.

5. The release of nuclear power is accompanied by the production of more fissionable material. A nuclear power plant is unique in that at the same time it burns up its fuel, it produces new fuel. Either one can consider the fissionable material to be a by-product of the power or one can view the power as a by-product in the production of fissionable and radioactive materials.

From this point of view the economics of nuclear power is rather more like the economics of water power than that of coal power. We often build dams for flood control, irrigation, or soil conservation; the power which is produced is in these cases secondary. Similarly we shall build plutonium factories in which the power is a by-product.

We can conceive of a vast complex of large nuclear installations whose many functions include both plutonium and power production. We can compare this complex to, say, the Tennessee Valley Authority.

What can the Congress do to create conditions in which such a development can flourish? There are two problems hampering the development of atomic power. Because of security, we are low in trained personnel. There are not more than 15 men in the entire country who have at this moment a sufficient grasp of the process to direct the development of a nuclear power plant. Nuclear technology will develop normally only when any qualified person has access to the data which will enable him to develop his ideas.

The second problem is more serious. The whole previous testimony, has dealt with the profound international implications of atomic energy. International aspects will determine our domestic atomic energy development. A satisfactory control system will enable us to relax our security regulations and atomic power will develop normally. Without a control system, the development will be stifled by secrecy and fear.

If, by not building power plants we could really avoid war, I would agree with such proposals. But atomic power can cure as well as kill. We cannot, and we must not keep atomic power in a Pandora's Box. Rather we must develop atomic power, and we must develop the power to control it.

The Federation of Atomic Scientists

National Committee on Atomic Information

One of the most heartening developments in the publicity field, full of promise for the dissemination on a national scale, of accurate information on the implications of atomic energy stems from the efforts of the FAS.

On November 16 a joint conference was held in the Mayflower Hotel, Washington, D.C. between the Federation of Atomic Scientists and representatives of 50 national organizations which effectively reach 10 million citizens. The participating organizations represent in some cases widely different opinion on specific social and political problems; they exhibit unusual unanimity on the paramount issue of atomic energy. The original list of organizations follows:

Altrusa International; American Council on Education; American Bar Association; American Council, Institute of Pacific Relations; American Council of Learned Societies; American Federation of Labor; American Jewish Congress; American Jewish Conference; American Peace Society; American Association of University Professors; American Association of University Women; American Unitarian Association; Americans United for World Organization; American Veterans Committee; Association of the Junior Leagues of America; Brotherhood of Railroad Trainmen; Board of Christian Education of the Presbyterian Church of U.S.A.; Congress of Industrial Organizations; Commission on a Just and Durable Peace, instituted by The Federal Council of the Churches of Christ in America; Carnegie Endowment for International Peace; Catholic Association for International Peace; Council for Social Action of the Congregational Christian Churches; Council on Christian Social Progress of the Northern Baptist Convention; General Convention of the Protestant Episcopal Church; General Federation of Women's Clubs; Independent Citizens Committee of the Arts, Sciences and Professions; Institute of International Education; Institute on World Organization; Kiwanis International; National Association for the Advancement of Colored People; National Congress of Parents and Teachers Associations; National Education Association; National Council of Jewish Women; National League of Women Voters; National Womens Trade Union League of America; Methodist Church, Womens Division; National Council of Farmer Cooperatives; National Council of Negro Women; National Farmers Union; National Lawyers Guild; National Negro Congress; Railway Labor Executives Association; Southern Conference for Human Welfare; Synagogue Council of America; Union for Democratic Action; United Council of Church Women; Womens Action Committee for Victory and Lasting Peace; Young Womens Christian Association, National Board; National Citizens Political Action Committee.

A second meeting on Dec. 18 set up a National Committee on Atomic Information, consisting of one member of each organization.

A steering committee of 17 was elected. It includes J. A. Simpson as FAS representative. The funtions of the National Committee is to "receive regularly from the Federation of Atomic Scientist and its affiliated scientific groups findings and information on atomic energy", and to promote the widest possible understanding of the facts and implications of developments in the field of atomic energy." For this purpose the National Committee has set up a Washington office, to distribute material to the national organizations represented on the Committee.

National Organization of Scientists

Almost immediately after the formation of the Federation of Atomic Scientists, steps were taken to organize a national federation of scientists including non-project groups. (Reported in No. 1 of this Bulletin)

A second meeting of representatives of scientific organizations was held in Washington on Dec. 7 and 8. The ASC delegate was A. S. Langsdorf. The conference agreed to set up a national organization tentatively called the Federation of American Scientists (FAmS) and adopted a constitution which was similar to the draft prepared by the ASC.

The question of ratifying of the constitution will be discussed at the general meeting of the ASC on Wed., Dec. 26 which will instruct our delegates to the third meeting (New York City, Jan. 4 and 5) on the subject of the national science organization. It is also hoped to discuss the subject with the representatives of the other site organizations at a preliminary meeting in Chicago on Dec. 27.

Mining Controls . . . *Cont'd*

only a few laboratories and small-scale plants.

(5) To safeguard all nations against consequences of clandestine mining of uranium by a nation bent on evading the controls, mining inspectors, preferably recruited from small nations, should be employed by the U.N.O. commission. These inspectors must have the right:

(a) to inspect all mines whose locations have been reported by governments to make sure that they yield no uranium; in most cases, a single inspection will be sufficient to certify the mine as harmless.

(b) to conduct aerial surveys of regions whose geological structure is such as to make the occurrence of uranium ores likely, and to investigate on the ground all suspicious activities noticed in these aerial surveys.

Assuming that an agreement on aerial surveys could be reached on a political level, the main technical question to be discussed by experts is the reliability of the last-mentioned method of detecting illicit mining. In its favor one may quote the fact that uranium production from low-grade ores will necessitate the moving of large amounts of rock and will therefore be difficult to conceal from aerial observations, while the finding of exceptionally rich uranium deposits, of which only two or three have been discovered in the world before 1940, will be difficult to keep a secret from the world.

Compared to controls applying to plants producing fissionable materials, mining control has two features to recommend it: (1) It does not require the inspection of all possible factories and laboratories, and (2) It operates at the production stage most distant from the finished bomb, allowing the maximum possible time interval between detected violation and actual possession of atomic bombs.

MORE ON

SENATE HEARINGS

December 6. S. A. Goudsmit. Dr. Goudsmit, head of a mission sent to Germany to learn what the Germans did on atomic energy, disclosed that we knew as little of Germany's progress as they about ours until it was definitely determined a year ago that the German atomic project had accomplished little.

"They had no pilot plant. It was all in the laboratory stage. Their scientists felt it would take from fifty to a hundred years."

December 7. E. P. Wigner said that the present attempts to maintain secrecy on atomic energy would be both unsuccessful and harmful. He said American scientists held three "secrets" not yet available in published information:

(1) The physical constants of the materials used in the bomb.

(2) A few methods of calculations and their results.

(3) The technical details of installations.

Conference With Press Representatives

Members of the ASC were asked to participate in a conference of representatives of the press held by the Public Administration Clearing House at the University of Chicago to consider the problem of "Government and Reconversion." Two hours of the Wednesday afternoon (Dec. 19th) program were devoted to a discussion of the atomic bomb and its implications. It was pointed out that any discussion of reconversion really presupposed the establishment of strong international controls so that the world can live in peace.

During the discussion period the newsmen were asked why the public did not take the atomic bomb as seriously as they should and what could be done to make them realize the importance of it. Their answers included: "People do not understand the science involved and therefore the whole thing is a mystery to them." "The idea of extermination is not very real to people. They must be shown about it by movies, pictures and even actual experience. Publicize the tests to be held on battleships and circulate widely movies of the tests." "People have heard about how horrible this last war would be and how bacteriological warfare and gas and high explosives were going to wipe out civilization and then didn't. They think the atomic bomb is just such another fantastic claim."

I. C. C. Science Section

On December 11, the Science Division of the I.C.C. held a meeting at which H. C. Urey summarized his ideas of world control and presented a resolution which was unanimously adopted. Telegrams were sent to Mr. Truman, Mr. Byrnes, and Sen. MacMahon.

At an informal gathering on Dec. 18 A. C. Spectorsky, editor of the Chicago Sun Book Week outlined the techniques of distributing published information, and described specific plans of three prominent national publishers for the publication of two or more volumes on atomic energy.

A working committee of artists, writers, scientists, and publicity men was formed, which will work on these volumes. Coordinators were named for each group of workers represented: Al Ghiorso for the scientists, S. Conway for the writers and T. Poore for the artists. It was suggested that A.S.C. members act as scientific and technical advisors to this committee.

DENVER CONFERENCE ON ATOMIC ENERGY

A conference on atomic energy and its social implications, sponsored by the Social Science Foundation of the University of Denver was held in Denver, Col. on December 7, 8, and 9. The delegates, represented the natural and social sciences, a variety of civic groups, private corporations, the press and the radio. Drs. S. K. Allison, H. Benjamin, A. H. Compton, E. H. Levi, R. Redfield, J. C. Starns acted as Conference leaders.

The recommendations of the Conference are in full agreement with the general policies laid down by the A.S.C. and with the Rye resolutions. In regard to the recognition of the importance of full cooperation with social scientists and educators the proposed actions of the Denver meeting will do much in broadening the progress of public education started by the A.S.C. and F.A.S.

The Conference expressed its "great appreciation of the work of the Federation of Atomic Scientists who came out of their laboratories to perform a great and unique educational service in making known the facts about atomic energy and the consequences of atomic weapons to mankind." It was urged that an organization be built around the F.A.S. which would include outstanding social scientists and experts on public relations.

Among the concrete actions undertaken for future work far-reaching provisions were made to publicize the results of the Conference here and abroad. It was recommended that in all universities and colleges represented, cooperative research with other institutions should be encouraged in every possible way, and the aims and methods of general education should be reviewed of human interdependance in the atom or revised in the light of the recognition ic age.

The Social Science Foundation of the University of Denver has assumed the responsibility of establishing a continuing organization among the institutions represented at the Conference, in order to carry out the aims and agreements reached, in full cooperation with other existing organizations.

COMMITTEES:

Publicity and Contacts
(Chairman—K. Way)

Meetings Mondays, 4:30 P.M., Room 208 in Jones Chemistry Bldg.

Speakers Bureau .....A. S. Langsdorf
Radio and Newspapers .....R. Adams
Magazines .....K. Way
Organization .....H. Hyman

Materials
(Chairman—L. I. Katzin)

Meetings Fridays, 5 P.M. in Room 208 in Jones Chemistry Bldg.

Legis. Research .....F. L. Friedman
Records .....R. L. Platzman